

## C L A I M S

What is claimed and desired to be secured by Letters Patent is as follows:

1. A closure for setting engagement with a structural member and comprising:
  - (a) a substantially cylindrical body having an outer cylindrical surface relative to a central closure axis;
  - (b) a substantially continuous guide and advancement flange extending helically about said outer cylindrical surface in a forward advancement direction relative to said closure axis, said flange having a leading surface and a trailing surface relative to said forward advancement direction;
  - (c) at least one of said leading surface or said trailing surface being compound in contour and including an inward anti-splay surface component facing generally toward said closure axis;
  - (d) an installation head for rotating and torquing said body to a preselected torque; and

- (e) said body having a pair of spaced apertures that intersect with a rear surface of said closure body and that are parallel to and spaced from said closure axis and a radially outer surface of said closure body; said apertures being sized and shaped to be adapted to receive a removal tool for removing said body subsequent to installation.
- 2. The closure as set forth in Claim 1 wherein:
    - (a) said apertures are cylindrical in shape.
  - 3. The closure as set forth in Claim 1 wherein:
    - (a) said apertures extend from said body rear surface to said forward surface.

4. The closure as set forth in Claim 1 wherein:
  - (a) said installation head includes a grippable radially outer surface that is shaped to enable non-slip engagement of said installation head by an installation tool; and
  - (b) said installation head being connected to said closure by a breakaway region formed in such a manner that said breakaway region fails in response to a selected level of torque between said installation head and said closure to enable separation of said installation head from said closure.
  
5. The closure as set forth in Claim 1 and including:
  - (a) said closure having a forward end relative to said forward advancement direction; and
  - (b) said body having a V-shaped set ring and an axially aligned point formed on said leading end to enhance setting engagement of said closure into a surface of a structural member.

6. The closure as set forth in Claim 1 in combination with a bone implant screw adapted for connection to a bone fixation structural member, said bone implant screw including:

- (a) a threaded shank adapted for threaded implanting into a bone;
- (b) an open head formed by a pair of spaced apart arms having mutually facing channel surfaces defining a structural member receiving channel therebetween to receive a bone fixation structural member; and
- (c) said mutually facing channel surfaces each having mating guide and advancement structure formed therein which are compatible for mating with said guide and advancement flange of said closure to enable rotation guiding and advancement of said closure into said channel so as to be adapted to clamp said bone fixation structural member when positioned therein.

7. The closure and bone implant screw combination as set forth in Claim 6 wherein:
- (a) said mating guide and advancement structure of said bone implant screw include an outward anti-splay surface component which cooperates with said inward anti-splay surface component of said closure to provide an interlocking fit when joined so as to resist a tendency of said arms to splay in reaction to torquing said closure into engagement with said bone fixation structural member.
8. The closure and bone screw combination as set forth in Claim 7 wherein:
- (a) said guide and advancement flange has a relatively enlarged outer periphery which forms said inward anti-splay surface component;
  - (b) said mating guide and advancement structures are contoured in a complementary manner to said guide and advancement flange to form said outward anti-splay surface component; and
  - (c) said inward anti-splay surface component engages said outward anti-splay surface component when

said closure is guided and advanced into said open screw head of said bone implant screw.

9. A closure for setting engagement with a structural member and comprising:
- (a) a body having an outer cylindrical surface relative to a central closure axis and a driving installation head;
  - (b) a guide and advancement flange extending helically and substantially continuously about said outer cylindrical surface in a forward advancement direction relative to said closure axis, said flange having a trailing surface relative to said forward advancement direction;
  - (c) said trailing surface being compound in contour and including an inward anti-splay surface component facing generally toward said closure axis; and
  - (d) said body having a pair of spaced apertures formed therein which are each elongated along and spaced from said closure axis; said bores opening onto a trailing surface of said body and extending substantially parallel to said closure axis and

being spaced from said body outer surface; and  
said apertures being sized and shaped to receive a  
removal tool.

10. The closure as set forth in Claim 9 and including:

- (a) said installation head is shaped to enable non-slip engagement of said installation head by an installation tool; and
- (b) said installation head being connected to said closure by a breakaway region formed in such a manner that said breakaway region fails in response to a selected level of torque between said installation head and said closure to enable separation of said installation head from said closure.

11. The closure as set forth in Claim 9 and including:

- (a) said closure having a forward end relative to said forward advancement direction; and
- (b) said closure having a V-shaped set ring formed on said forward end to enhance setting engagement of said closure into a surface of a structural member.

12. The closure as set forth in Claim 9 in combination with a bone implant screw adapted for connection to a bone fixation structural member, said bone implant screw including:

- (a) a threaded shank adapted for threaded implanting into a bone;
- (b) an open head having a pair of spaced apart arms having mutually facing channel surfaces defining a structural member receiving channel to receive a bone fixation structural member therebetween; and
- (c) each of said mutually facing channel surfaces having mating internal guide and advancement structure formed therein which are compatible with said flange of said closure to enable advancement of said closure into said channel to thereby clamp said bone fixation structural member when positioned therein.

13. The closure and bone implant screw combination as set forth in Claim 12 wherein:
- (a) each of said guide and advancement structure of said bone implant screw include an outward anti-splay surface component which cooperates with said inward anti-splay surface component of said closure in such a manner so as to resist a tendency of said arms to splay in reaction to torquing said closure into engagement with said fixation structural member.
14. The combination as set forth in Claim 13 wherein:
- (a) said flange has a relatively enlarged outer periphery which forms said inward anti-splay surface component;
  - (b) each of said guide and advancement structures are contoured in a complementary manner to said external thread to form said outward anti-splay surface component; and
  - (c) said inward anti-splay surface component engages said outward anti-splay surface component when said closure is rotated into said open screw head of said bone implant screw.

15. A closure for setting engagement with a structural member and including a substantially cylindrical body having an outer cylindrical surface relative to a central closure axis and a substantially continuous guide and advancement flange extending helically about said outer cylindrical surface in a forward advancement direction relative to said screw axis; said flange having a leading surface and a trailing surface relative to said forward advancement direction and a break away installation head; at least one of said leading surface or said trailing surface being compound in contour and including an inward anti-splay surface component facing generally toward said closure axis; and said body having a pair of spaced bores formed therein that are elongated along said closure axis with said bores opening onto a body trailing surface and being substantially parallel to said closure axis and spaced from the body outer surface.

16. The closure as set forth in Claim 15 wherein said bores are cylindrical in shape and extend from a leading surface of said body to the trailing surface thereof.
17. The closure as set forth in Claim 15 and including:
  - (a) said installation head is shaped to enable non-slip engagement of said installation head by an installation tool; and
  - (b) said installation head being connected to said closure by a breakaway region formed in such a manner that said breakaway region fails in response to a selected level of torque between said installation head and said closure to enable separation of said installation head from said closure.
18. The closure as set forth in Claim 15 and including:
  - (a) said closure having a forward end relative to said forward advancement direction; and
  - (b) said closure having a V-shaped set ring formed on said forward end to enhance setting engagement of said closure into a surface of such a structural member.

19. The closure as set forth in Claim 15 in combination with a bone screw adapted for connection to a bone fixation structural member, said bone implant screw including:
- (a) a threaded shank adapted for threaded implanting into a bone;
  - (b) an open head formed by a pair of spaced apart arms having mutually facing channel surfaces defining a structural member receiving channel to receive a bone fixation structural member;
  - (c) each of said mutually facing channel surfaces having respective mating guide and advancement structures formed therein which are compatible with said guide and advancement flange of said closure to enable guiding and advancement of said closure into said channel to thereby clamp said bone fixation structural member therein; and
  - (d) said mating guide and advancement structures of said bone implant screw including an outward anti-splay surface component which cooperates with said inward anti-splay surface component of said closure in such a manner so as to resist a tendency of said arms to splay in reaction to

torquing said closure into engagement with said fixation structural member.

20. The closure and bone screw combination as set forth in Claim 19 wherein:

- (a) said guide and advancement flange has a relatively enlarged outer periphery which forms said inward anti-splay surface component;
- (b) said mating guide and advancement structures are contoured in a complementary manner to said guide and advancement flange to form said outward anti-splay surface component; and
- (c) said inward anti-splay surface component engages said outward anti-splay surface component when said closure is guided and advanced into said open screw head of said bone implant screw.